User's Manual

CS+ Code Generator

Integrated Development Environment

User's Manual: Peripheral Function Operation

Target Device

RL78 Family

RX Family

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(2012.4)

How to Use This Manual

This manual describes the role of the CS+ integrated development environment for developing applications and systems for RL78 family, and provides an outline of its features.

CS+ is an integrated development environment (IDE) for RL78 family, integrating the necessary tools for the development phase of software (e.g. design, implementation, and debugging) into a single platform.

By providing an integrated environment, it is possible to perform all development using just this product, without the need to use many different tools separately.

Readers	This manual is intended for users who wish to understand the functions of the CS+ and design software and hardware application systems.
Purpose	This manual is intended to give users an understanding of the functions of the CS+ to use for reference in developing the hardware or software of systems using these devices.
Organization	This manual can be broadly divided into the following units. 1.GENERAL 2.FUNCTIONS A.WINDOW REFERENCE
How to Read This Manual	It is assumed that the readers of this manual have general knowledge of electricity, logic circuits, and microcontrollers.

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Active low representation:	XXX (overscore over pin or signal name)
Note:	Footnote for item marked with Note in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Decimal ... XXXX Hexadecimal ... 0xXXXX

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1. GENERAL

CS+ is an integrated development environment used to carry out tasks such as design, coding, build and debug for developing application systems.

This chapter gives an overview of the Code Generator.

1.1 Overview

The Code Generator, which is one of the components provided by CS+, enables you to output the source code (device driver programs, C source files and header files) necessary to control the peripheral functions (clock generator, port functions, etc.) provided by the microcontroller by configuring various information using the GUI.

1.2 Features

The Code Generator has the following features.

(1) Code generating function
The Code Generator can output not only device driver programs in accordance with the information configured using the GUI, but also a build environment such as sample programs containing main functions and link directive files.

(2) Reporting function
You can output configured information using the Code Generator as files in various formats for use as design documents.

(3) Renaming function
The user can change default names assigned to the files output by the Code Generator and the API functions contained in the source code.

2. FUNCTIONS

This chapter describes the key functions provided by the Code Generator along with operation procedures.

Remark In this chapter, an example where an RL78/L13 (ROM: 128KB) R5F10/WMG (80pin) is the target device is used to explain the key functions.

2.1 Overview

The Code Generator outputs source code (device driver programs) based on information selected/entered on CS+ panels that is needed to control the peripheral functions (clock generator, port functions, etc.) provided by the device.
The following sections describe the operation procedures for Code Generator.

(1) Start CS+
Launch CS+ from the [Start] menu of Windows.

(2) Create/Open project
Create a new project (that defines a kind of project, microcontroller to be used, build tools to be used, etc.) or load an existing project.

(3) Open Peripheral Functions Panel
Open the Peripheral Functions panel used to configure the information necessary to control the peripheral functions (clock generator, port functions, etc.).

(4) Enter Information
Configure the information necessary to control the peripheral functions (clock generator, port functions, etc.) in the Peripheral Functions panel.

(5) Confirm Source Code
Confirm the source code (device driver program) that reflects the information configured in the Peripheral Functions panel.

(6) Output Source Code
Output the source code (device driver program) to the specified folder.

(7) Output Report Files
Output report files (a file containing information configured using Code Generator and a file containing information regarding the source code) to the specified folder.

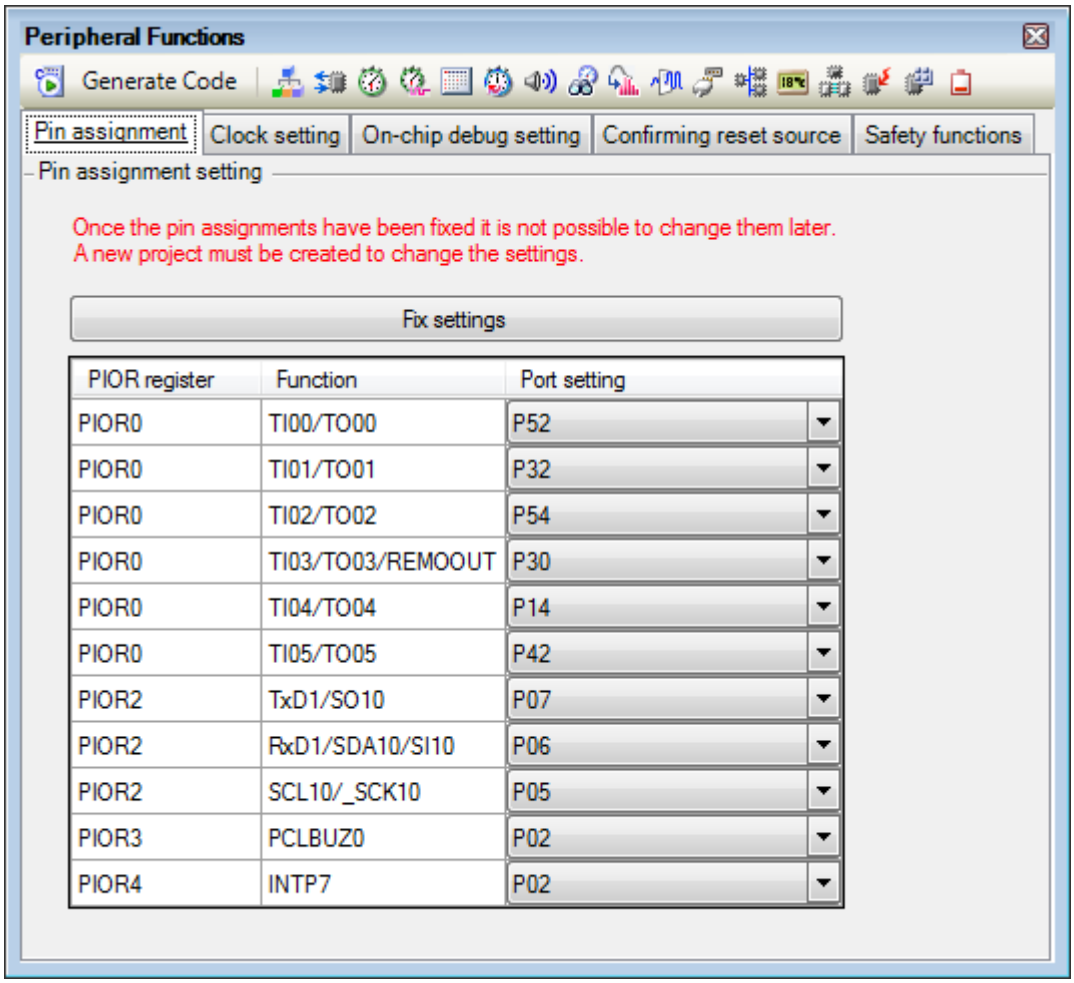
(8) Save project
Save a project.

2.2 Open Peripheral Functions Panel

The Peripheral Functions panel is opened to set the information necessary to control the peripheral functions (clock generator, pin functions, etc.) provided in the device.

To open the Peripheral Functions panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] (>> Peripheral function node) in the Project Tree panel.

Figure 2.1 Open Peripheral Functions Panel



Remark If an unsupported device is defined in the project for Code Generator, then ”[Code Generator (Design Tool)] node” will hide under [*Project name* (Project)] in the Project Tree panel.

2.3 Enter Information

Configure the information necessary to control the peripheral functions (clock generator, port functions, etc.) in the information setting area of the Peripheral Functions panel which is opened as described in "2.2 Open Peripheral Functions Panel".

Remark When controlling multiple peripheral functions, repeat the procedures described in "2.2 Open Peripheral Functions Panel" through "2.3 Enter Information".

2.3.1 Input rule

Following is the rules for input to the Peripheral Functions panel.

(1) Character set
Character sets that are allowed to input are as follows.

ASCII	1-byte alphabet, number, symbol
Shift-JIS	2-byte alphabet, number, symbol, Hiragana, Katakana, Kanji and 1-byte Katakana
EUC-JP	2-byte alphabet, number, symbol, Hiragana, Katakana, Kanji and 1-byte Katakana
UTF-8	2-byte alphabet, number, symbol, Hiragana, Katakana, Kanji (include Chinese character) and 1-byte Katakana

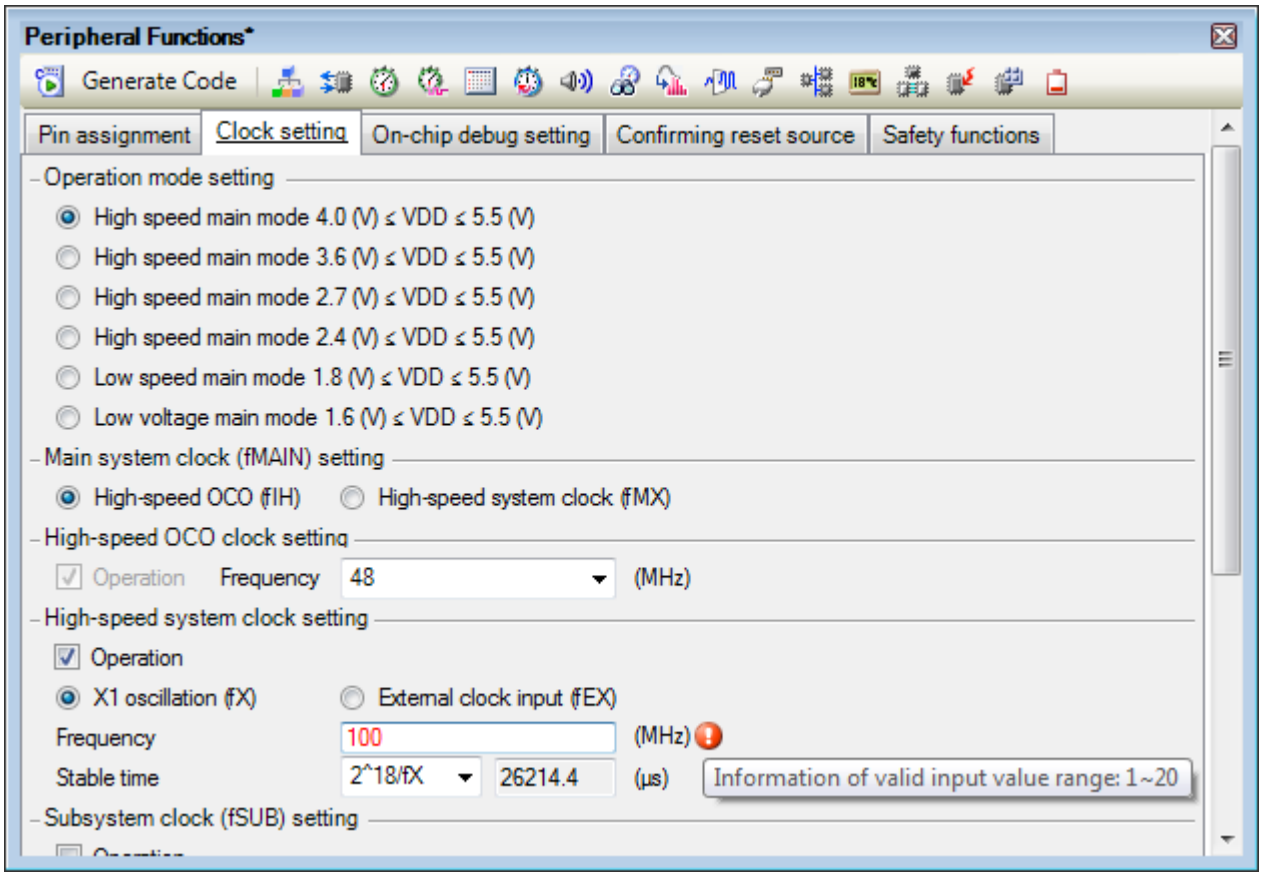
(2) Number
Notations allowed when entering numbers are as follows.

Decimal number	A numeric value that starts with a number between 1 and 9 and followed by numbers between 0 and 9, and the numeric value 0
Hex number	A numeric value that starts with 0x and followed by a combination of numbers from 0 to 9 and characters from A to F (characters are not case sensitive)

2.3.2 Icon indicating incorrect entry

When performing code generation, if you enter an invalid string in the Peripheral Functions panel, or a required input is missing, then a icon displays next to the incorrect input, and the text is displayed in red to warn that there is a problem with the input.

Figure 2.2 Icon Indicating Incorrect Entry

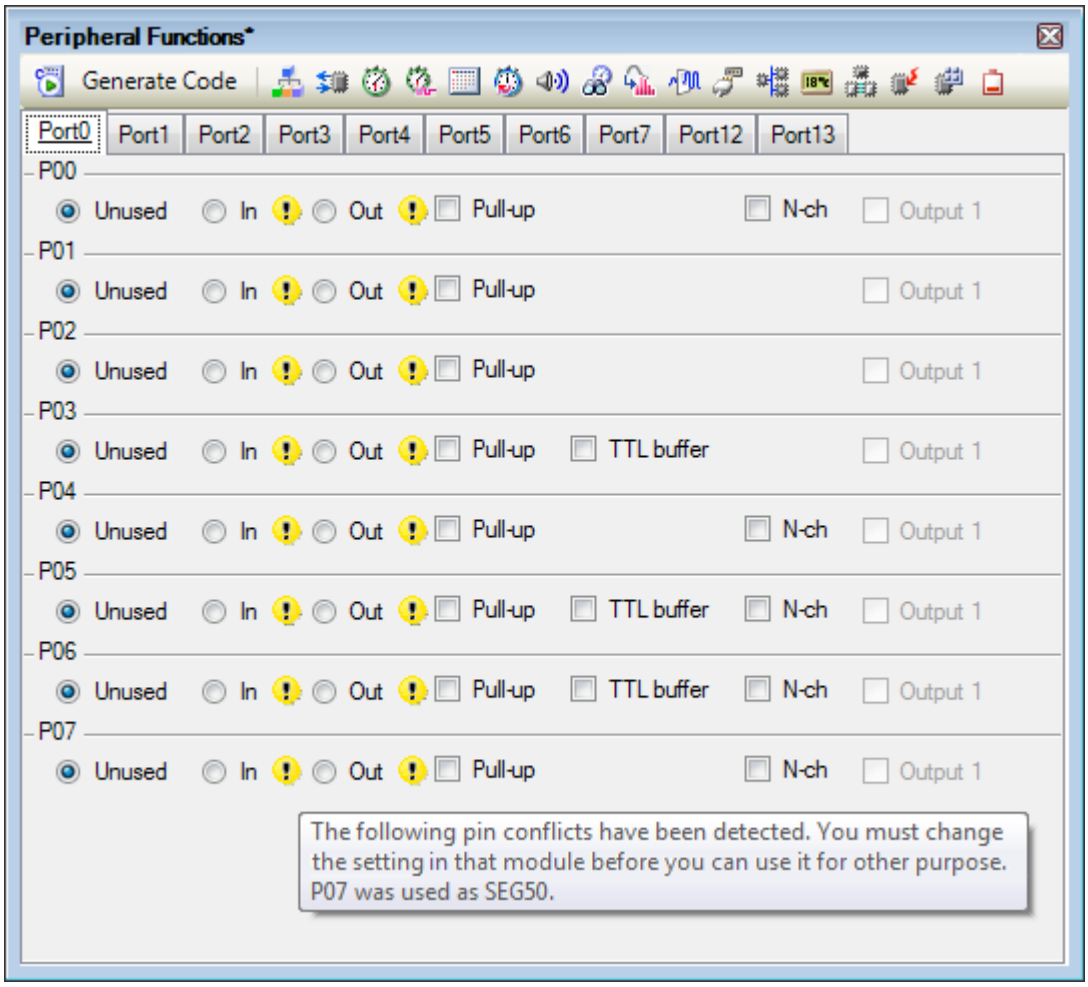


Remark If the mouse cursor is moved over the icon, information regarding the string that should be entered (tips for correcting the entry) popups.

2.3.3 Icon indicating pin conflict

If a conflict occurs between the pins while setting various peripheral functions in the Peripheral Functions panel, the icon is displayed at the location where the conflict occurs to warn the user of a conflict between the pins.

Figure 2.3 Icon Indicating Pin Conflict



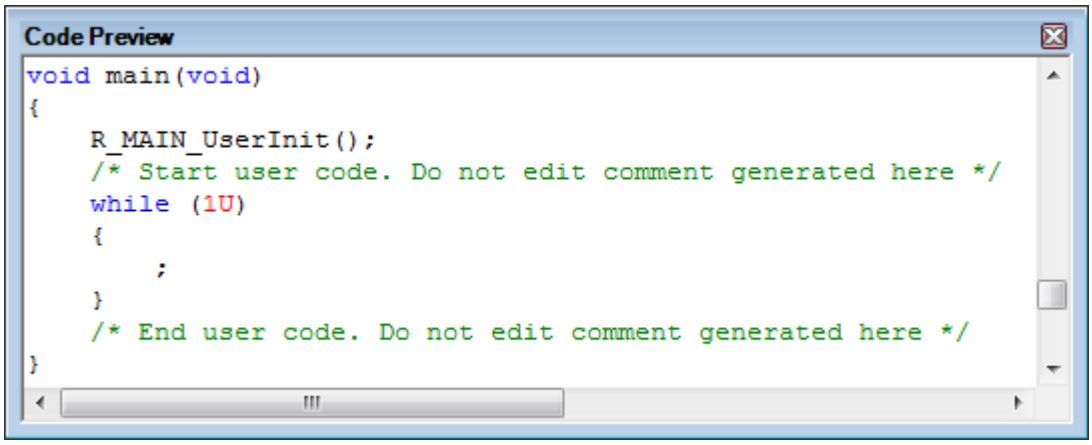
Remark If the mouse cursor is moved over the icon, information regarding the conflict between the pins (tips for avoiding the conflict) popups.

2.4 Confirm Source Code

Confirm the source code (device driver program) that reflects the information configured as described in "2.3 Enter Information".

To confirm the source code, use the Code Preview panel that opens by double-clicking [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node (>> API function node) in the Project Tree panel.

Figure 2.4 Confirm Source Code



Remark 1. You can change the source code to be displayed by selecting the source file name or API function name in the Project Tree panel.

Remark 2. The following table displays the meaning of the color of the source code text displayed in the Code Preview panel.

Green	Comment
Blue	Reserved word for C compiler
Red	Numeric value
Black	Code section
Gray	File name

Remark 3. You cannot edit the source code within the Code Preview panel.

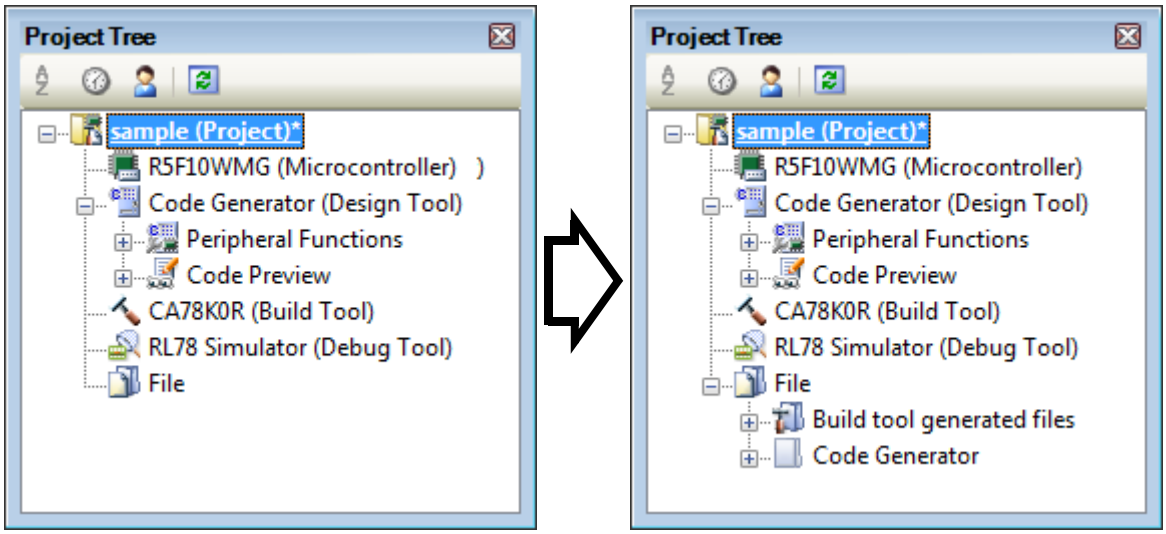
Remark 4. For some of the API functions, values such as the register value are calculated and finalized when the source code is generated (when the Generate Code button on the Peripheral Functions panel is pressed). For this reason, the source code displayed in this panel may not be the same as that would actually be generated.

2.5 Output Source Code

Output the source code (device driver program) by pressing the Generate Code button on the Peripheral Functions panel.

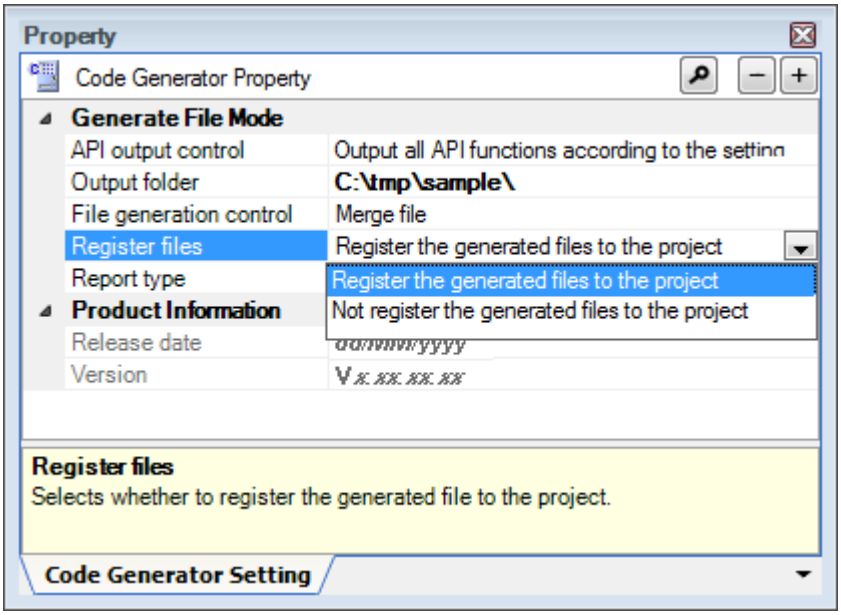
The destination folder for the source code is specified by clicking [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.

Figure 2.5 Output Source Code



Remark In order to both output source files and add them to the project (display the corresponding source file names in the Project Tree panel) when you click the Generate Code button, you must open the Property panel, and under [Code Generator Setting] tab >> [Generate File Mode] >> [Register files], specify "Register the generated files to the project".

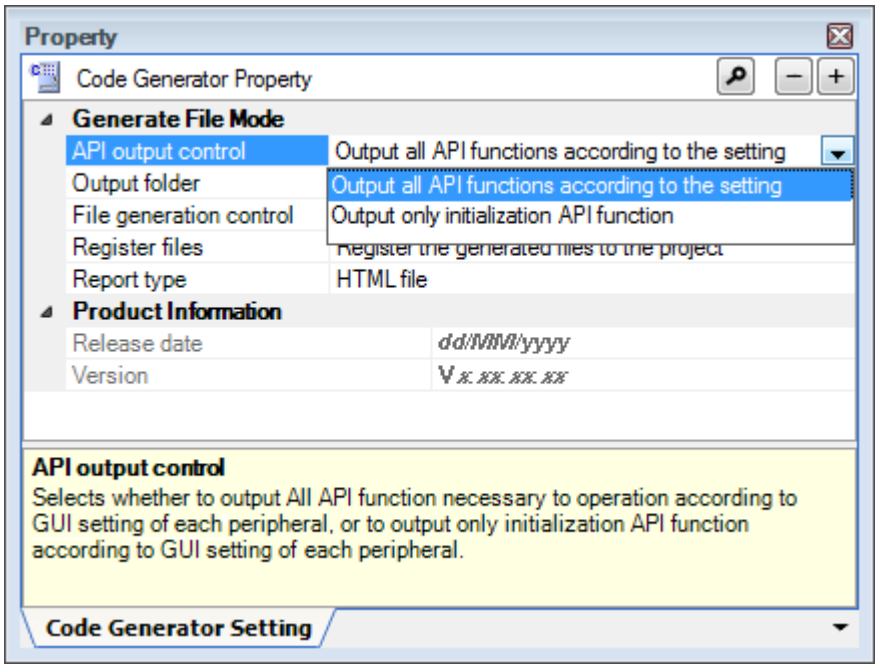
Figure 2.6 Configure Whether to Register



2.5.1 Set whether or not to generate source code

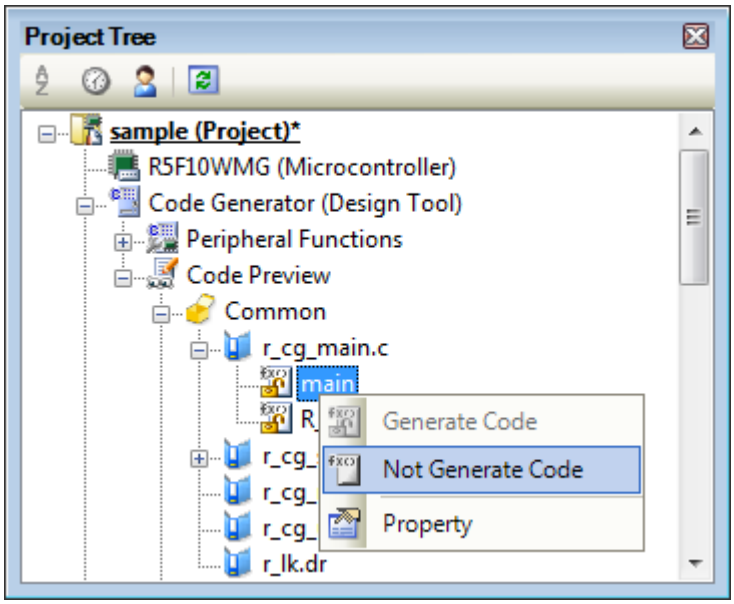
You can set the type of output API functions (all API functions or only initialization API functions) by selecting [Output all API functions according to the setting/Output only initialization API function] from [Code Generator Setting] tab >> [Generate File Mode] >> [API output control] in the Property panel.

Figure 2.7 Setting That Determines Type of API Functions


Property
Code Generator Property
Generate File Mode
API output control
Output all API functions according to the setting
Output folder
Output all API functions according to the setting
File generation control
Output only initialization API function
Register files
Report type
HTML file
Product Information
Release date
dd/MM/yyyy
Version
V.x.xx.xx.xx
API output control
Selects whether to output All API function necessary to operation according to GUI setting of each peripheral, or to output only initialization API function according to GUI setting of each peripheral.
Code Generator Setting

In the Code Generator, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node >> API function node in the Project Tree panel. “Setting That Determines Whether or Not to Generate Source Code” can be set in units of API functions by selecting “Generate Code/Not Generate Code” from the context menu, which is displayed by right clicking the mouse.

Figure 2.8 Setting That Determines Whether or Not to Generate Source Code



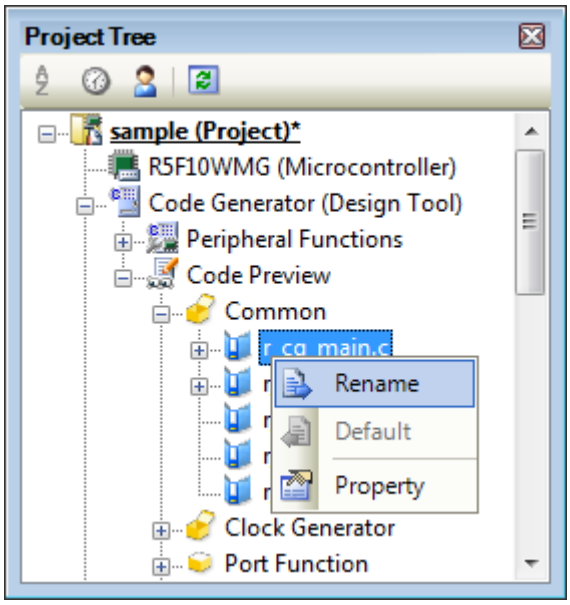
Remark “Setting That Determines Whether or Not to Generate Source Code” can be confirmed by the types of icons that are displayed immediately to the left of the API function nodes.

	Source code for the currently selected API function is generated. If this icon is displayed next to the API function, the corresponding source code must be generated (it is impossible to change the icon to).
	Source code for the currently selected API function is generated.
	Source code for the currently selected API function is not generated.

2.5.2 Change file name

In the Code Generator, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node in the Project Tree panel. The name of the file can be changed by selecting "Rename" from the context menu, which is displayed by right clicking the mouse.

Figure 2.9 Change File Name

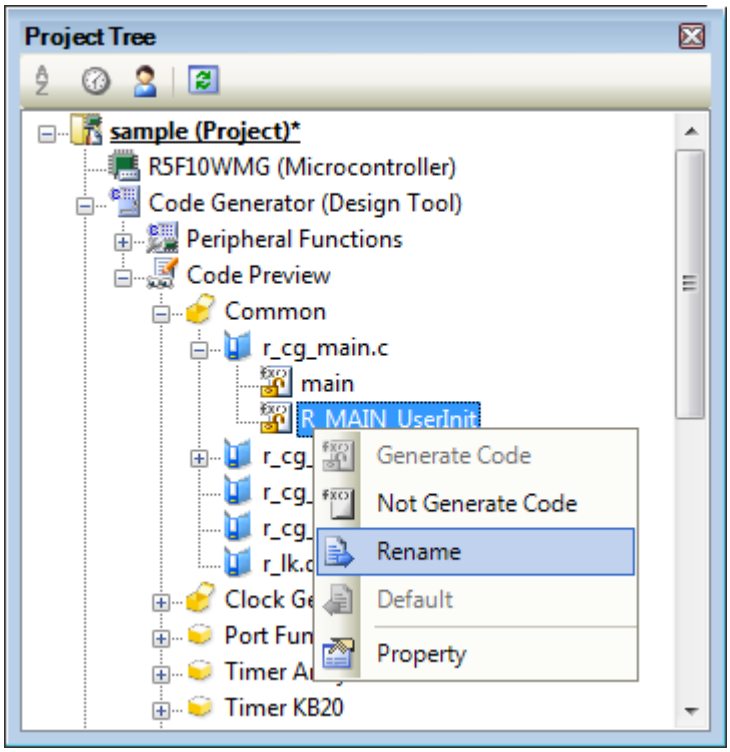


Remark To restore the default file name defined by the Code Generator, select [Default] from the context menu.

2.5.3 Change API function name

In the Code Generator, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node >> API function node in the Project Tree panel. The name of the API function can be changed by selecting "Rename" from the context menu, which is displayed by right clicking the mouse.

Figure 2.10 Change API Function Name



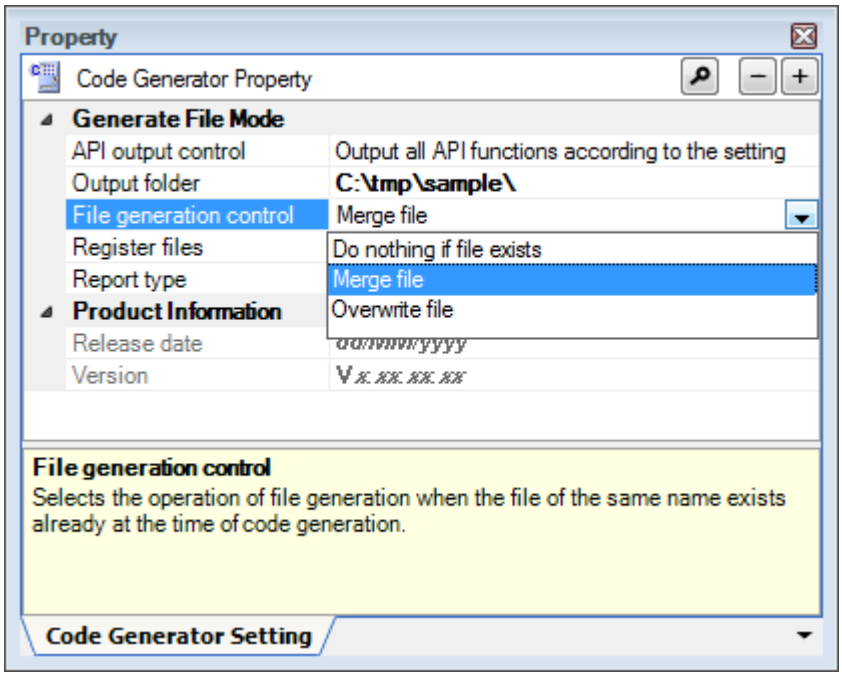
Remark 1. To restore the default name of the API function defined by the Code Generator, select [Default] from the context menu.

Remark 2. Some API functions (main, etc.) can not be changed the API function name.

2.5.4 Change output mode

The Code Generator is used to change the output mode (Do nothing if file exists, Merge file, Overwrite file) for the source code by selecting [Code Generator Setting] tab >> [Generate File Mode] >> [File generation control] in the Property panel.

Figure 2.11 Change Output Mode



The output mode is selected from the following three types.

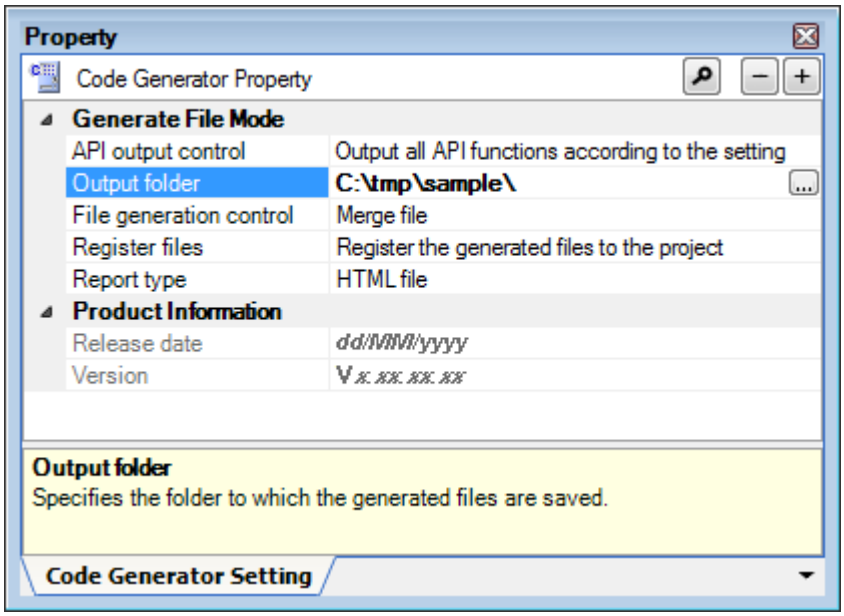
Do nothing if file exists	If a file with the same name exists, a new file will not be output.
Merge file	If a file with the same name exists, a new file is merged with the existing file. Only the section between "/* Start user code ... . Do not edit comment generated here */ " and "/* End user code. Do not edit comment generated here */" will be merged.
Overwrite file	If a file with the same name exists, the existing file is overwritten by a new file.

Remark Note that if the [Merge file] option is selected, the number of left braces ("{") and right braces ("}") must match in the parts to be merged. When the numbers do not match, processing for correct merging is not possible.

2.5.5 Change output destination folder

The Code Generator is used to change the output destination folder for the source code by selecting [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.

Figure 2.12 Change Output Destination Folder

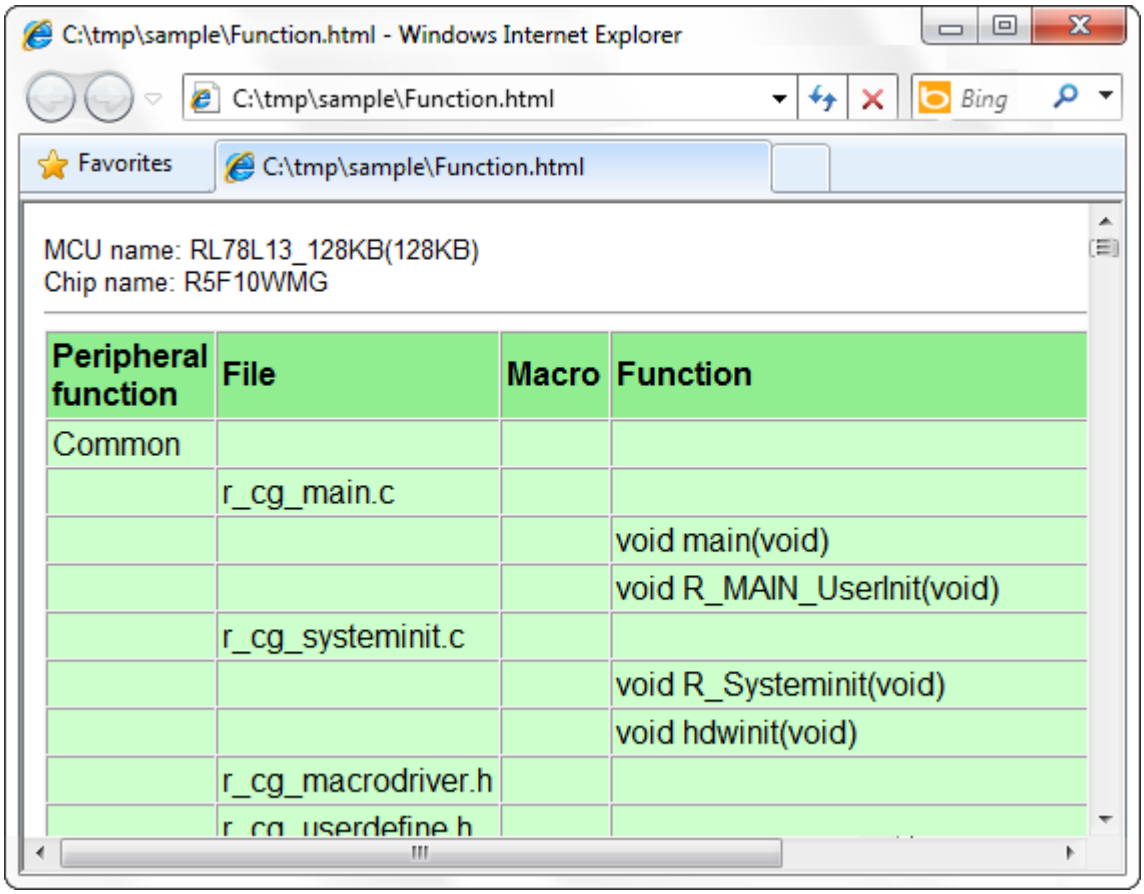


2.6 Output Report Files

Output report files (a file containing information configured using Code Generator and a file containing information regarding the source code) by first activating the Peripheral Functions panel or Code Preview panel, then selecting [File] menu >> [Save Code Generator Report].

The destination folder for the report file is specified by clicking [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.

Figure 2.13 Output Example of Report File "Function" (HTML File)



Remark 1. You can only use "Function" or "Macro" as a name of the report file.
See "2.6.1 Change output format" for details on the output format.

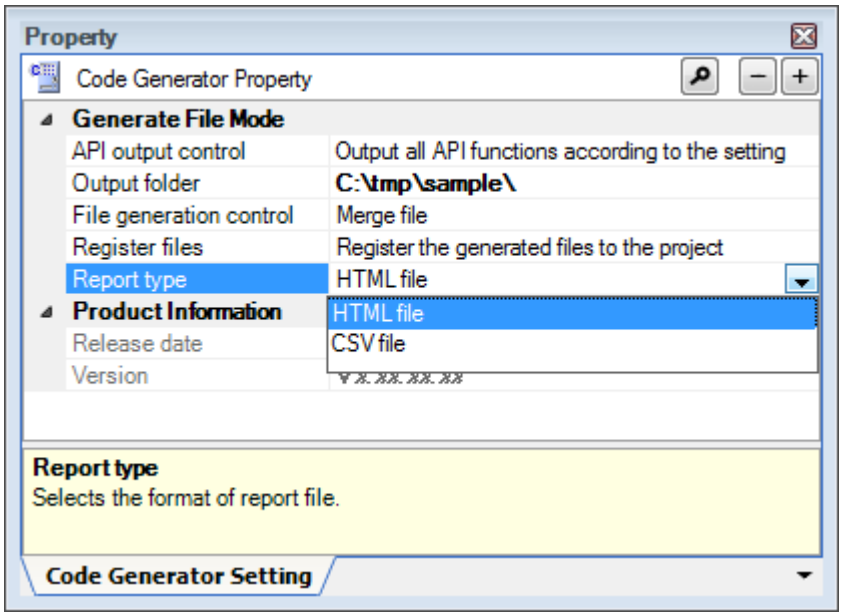
Function.*xxx*	A file that contains the information regarding the source code
Macro.*xxx*	A file that contains the information configured using Code Generator

Remark 2. The output mode of the report file is defined in "Overwrite file".

2.6.1 Change output format

The Code Generator is used to change the output format (HTML file or CSV file) of the report file by selecting [Code Generator Setting] tab >> [Generate File Mode] >> [Report type] in the Property panel.

Figure 2.14 Change Output Format



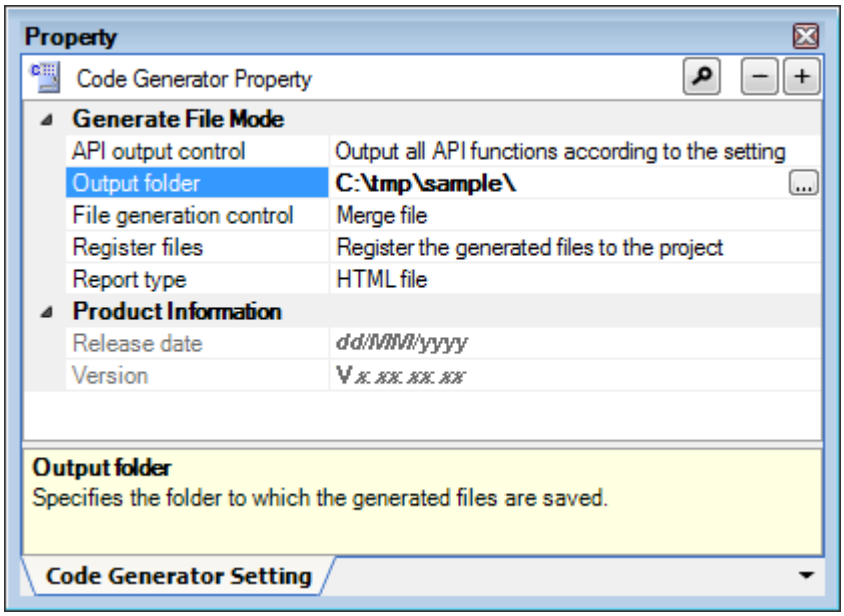
Remark The output format of the report file is selected from the two types shown below.

HTML file	Outputs in the HTML format.
CSV file	Outputs in the CSV format.

2.6.2 Change output destination folder

The Code Generator is used to change the output destination folder for the report file by selecting [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.

Figure 2.15 Change Output Destination Folder



A. WINDOW REFERENCE

This appendix explains in detail the functions of the windows, panels and dialog boxes of the Code Generator.

A.1 Overview

The Code Generator has the following windows, panels and dialog boxes.

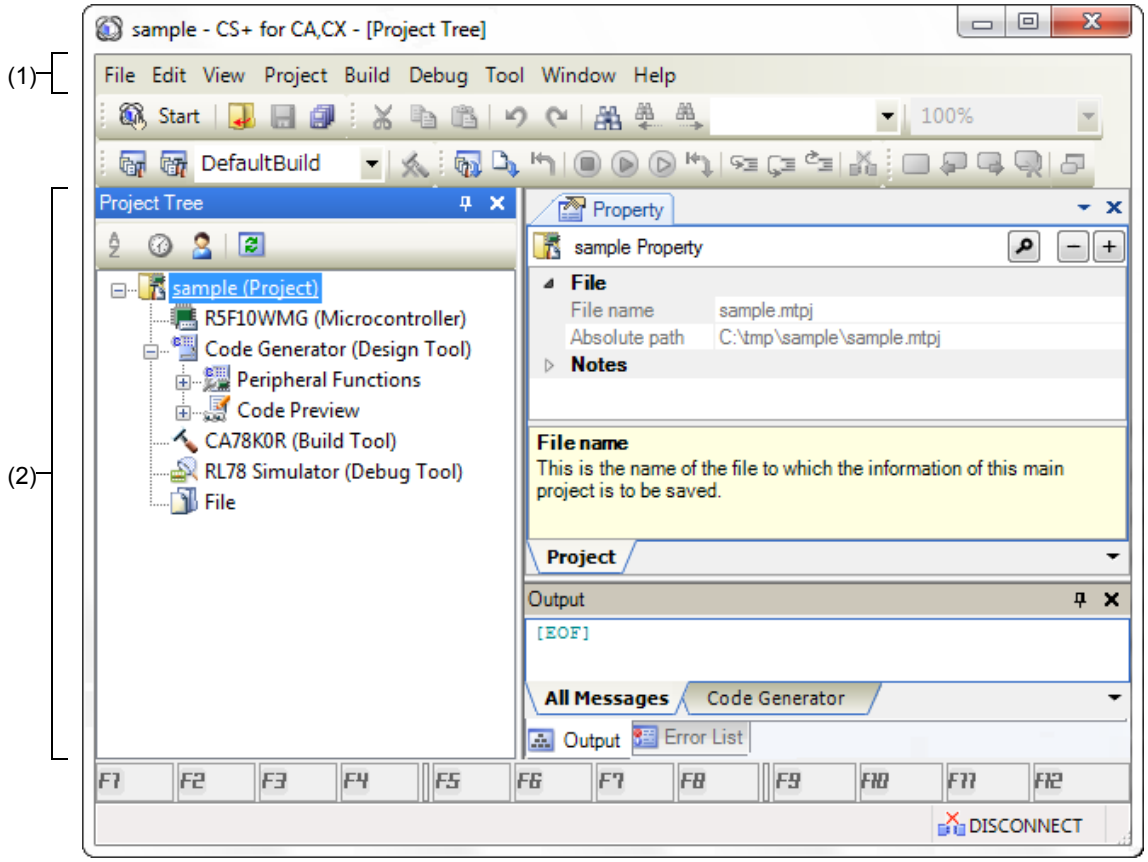
Table A.1 Window/Panel/Dialog Box List

Window/Panel/Dialog Box Name	Function
Main window	This is the first window to open when CS+ is launched. This window is used to operate various components (design tool, build tool, etc.) provided by CS+.
Project Tree panel	This panel displays the components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.
Property panel	This panel allows you to view the information on and change the setting for the node selected in the Project Tree panel.
Peripheral Functions panel	This panel allows you to configure the information necessary to control the peripheral functions (clock generator, port functions, etc.) provided.
Code Preview panel	This panel allows you to confirm the source code in accord with the settings of the Peripheral Functions panel.
Output panel	This panel displays operation logs for various components (design tool, build tool, etc.) provided by CS+.
Save As dialog box	This dialog box allows you to name and save a file.

Main window

This is the first window to open when CS+ is launched. This window is used to operate various components (design tool, build tool, etc.) provided by CS+.

Figure A.1 Main Window



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- From the [start] menu, select [All Programs] >> [Renesas Electronics CS+] >>[CS+].

[Description of each area]

(1) Menu bar
This area consists of the following menu items.

(a) [FIle] menu

Save Code Generator Report	Peripheral Functions panel/Code Preview panel-dedicated item Outputs report files (a file containing information configured using Code Generator and a file containing information regarding the source code). - The output format for the report file (either HTML file or CSV file) is selected by clicking [Code Generator Setting] tab >> [Generate File Mode] >> [Report type] in the Property panel. - The destination folder for the report file is specified by clicking [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.
Save Output-*Tab Name*	Output panel-dedicated item Saves the message corresponding to the specified tab overwriting the existing file.
Save Output-*Tab Name* As...	Output panel-dedicated item Opens the Save As dialog box for naming and saving the message corresponding to the specified tab.

(b) [Edit] menu

Undo	Property panel-dedicated item Cancels the effect of an edit operation to restore the previous state.
Cut	Property panel-dedicated item Sends the character string or lines selected with range selection to the clipboard and deletes them.
Copy	Property panel/Output panel-dedicated item Sends the character string or lines selected with range selection to the clipboard.
Paste	Property panel-dedicated item Inserts the contents of the clipboard at the caret position.
Delete	Property panel-dedicated item Deletes the character string or the lines selected with the range selection.
Select All	Property panel/Output panel-dedicated item Selects all the strings displayed in the item being edited or all the strings displayed in the Message area.
Search...	Code Preview panel/Output panel-dedicated item Opens the Search and Replace dialog box for searching strings with the [Quick Search] tab selected.
Replace...	Output panel-dedicated item Opens the Search and Replace dialog box for replacing strings with the [Whole Replace] tab selected.

(c) [View] menu

Project Tree	Project Tree panel-dedicated item Opens the Project Tree panel.
Property	Property panel-dedicated item Opens the Property panel.
Output	Output panel-dedicated item Opens the Output panel.

Code Generator 2	The cascading menu shown below is displayed.	
	Peripheral Functions	Peripheral Functions panel-dedicated item Opens the Peripheral Functions panel.
	Code Preview	Code Preview panel-dedicated item Opens the Code Preview panel.

(d) [Help] menu

Open Help for Project Tree Panel	Project Tree panel-dedicated item Displays the help of Project Tree panel.
Open Help for Property Panel	Property panel-dedicated item Displays the help of Property panel.
Open Help for [Code Generator]panel	Peripheral Functions panel-dedicated item Displays the help of Peripheral Functions panel.
Open Help for [Code Generator Preview]panel	Code Preview panel-dedicated item Displays the help of Code Preview panel.
Open Help for Output Panel	Output panel-dedicated item Displays the help of Output panel.

(2) Panel display area

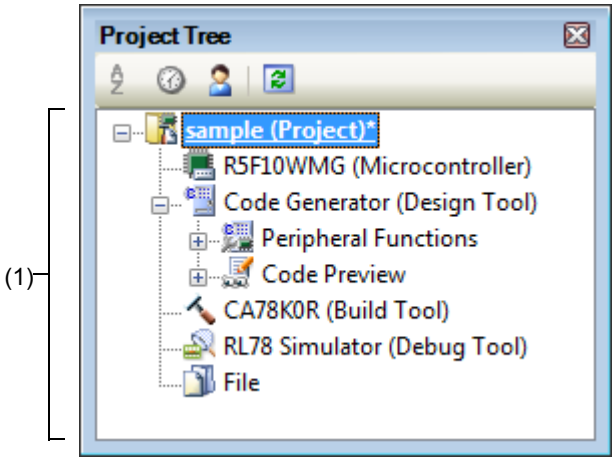
This area consists of multiple panels, each dedicated to a different purpose.
See the following sections for details on this area.

- Project Tree panel
- Property panel
- Peripheral Functions panel
- Code Preview panel
- Output panel

Project Tree panel

This panel displays components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.

Figure A.2 Project Tree Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- From the [View] menu, select [Project Tree].

[Description of each area]

(1) Project tree area
This area displays components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.

(a) Code Generator (Design Tool)
The sub-nodes of this node are [Peripheral Functions] and [Code Preview].

<1> [Peripheral Functions]
The sub-node of this node is the peripheral function node for the peripheral functions (clock generator, port functions, etc.) supported by the target device.

Peripheral function node	Double-click on a peripheral function node or press the [Enter] key after selecting a peripheral function node to open the Peripheral Functions panel, which is used to make settings for control of the corresponding peripheral function.

Icons that are displayed immediately to the left of each peripheral function node have the meanings listed below.

	Operation in the corresponding Peripheral Functions panel has been carried out.
	Operation in the corresponding Peripheral Functions panel has not been carried out.
,	The problem occurs on the settings became the manipulation to the other peripheral function node influences.

<2> [Code Preview]
The sub-node of this node is the peripheral function node for the peripheral functions (clock generator, port functions, etc.) supported by the target device.

Peripheral function node	Double-click on a source code node/API function node in the level of the hierarchy below this node or select a source code node/API function node and press the [Enter] key to open the Code Preview panel, which is used to confirm that the source code corresponds to the settings in the Peripheral Functions panel.

Icons that are displayed immediately to the left of each peripheral function node have the meanings listed below.

	Operation in the corresponding Peripheral Functions panel has been carried out.
	Operation in the corresponding Peripheral Functions panel has not been carried out.

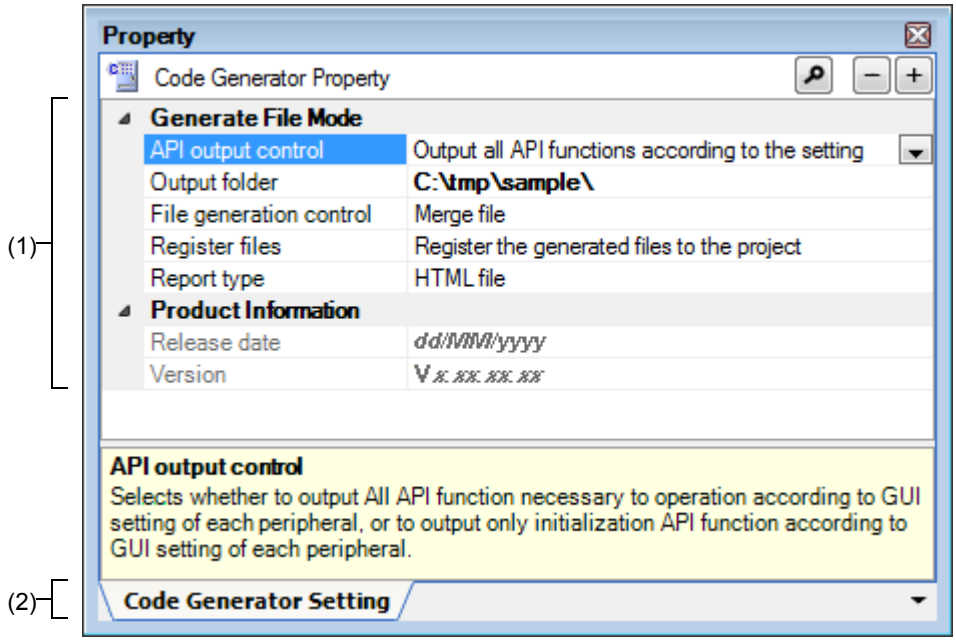
[Context menu]

Return to Reset Value	The default settings of the selected node are restored.
Property	Opens the Property panel corresponding to the selected node.

Property panel

This panel allows you to view the information on and change the setting for the node selected in the Project Tree panel.

Figure A.3 Property Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)], and then select [Property] from the context menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] (>> Peripheral function node), and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] (>> Peripheral function node), and then select [Property] from the context menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] (>> Peripheral function node >> Source code node >> API function node), and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] (>> Peripheral function node >> Source code node >> API function node), and then select [Property] from the context menu.

Remark 1. If this panel is already open, selecting a different [Code Generator (Design Tool)] in the Project Tree panel changes the content displayed accordingly.

Remark 2. If this panel is already open, selecting [Peripheral Functions] (>> Peripheral function node) in the Project Tree panel changes the content displayed to that corresponding to the selected node.

Remark 3. If this panel is already open, selecting [Code Preview] (>> Peripheral function node >> source code node >> API function node) in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

(1) Detail information display/change area
This area allows you to view the information on and change the setting for the node selected in the Project Tree panel.
The content displayed in this area differs depending on the node selected in the Project Tree panel.

(2) Tab selection area
In this panel, following tabs are contained (see the section explaining each tab for details on the display/setting on the tab).

- [Code Generator Setting] tab
- [Peripheral Function Information] tab (Product Information)
- [Peripheral Function Information] tab (Peripheral Function Information)
- [Code Preview Information] tab (Product Information)
- [Code Preview Information] tab (Peripheral Function Information)
- [Code Preview Setting] tab (File Information)
- [Code Preview Setting] tab (Function Information)

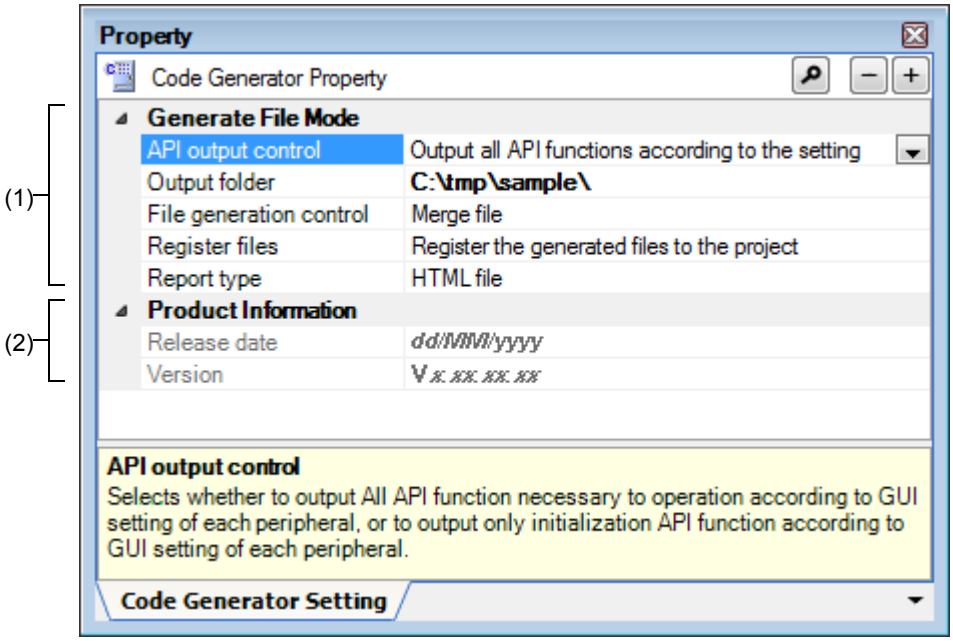
[Context menu]

Undo	Cancels the effect of an edit operation to restore the previous state.
Cut	Sends the character string or lines selected with range selection to the clipboard and deletes them.
Copy	Sends the character string or lines selected with range selection to the clipboard.
Paste	Inserts the contents of the clipboard at the caret position.
Delete	Deletes the character string or the lines selected with the range selection.
Select All	Selects all strings displayed in the item being edited.

[Code Generator Setting] tab

This tab allows you to view the information (Generate File Mode and Product Information) on and change the setting for the [Code Generator (Design Tool)] selected in the Project Tree panel.

Figure A.4 [Code Generator Setting] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)], and then select [Property] from the context menu.

Remark If this panel is already open, selecting a different [Code Generator (Design Tool)] in the Project Tree panel changes the content displayed accordingly.

[Description of each area]

(1) [Generate File Mode] category
This area allows you to view the information (API output control, Output folder, File generation control, Register files and Report type) on and change the setting for the [Code Generator (Design Tool)] selected in the Project Tree panel.

API output control	Select the type of API functions to be output.	
	Output all API functions according to the setting	All API functions for the peripheral functions (clock generation circuit, voltage detection circuit, etc.) that is set for use in the Peripheral Functions panel are output.
	Output only initialization API function	Of the API functions for the peripheral functions (clock generation circuit, voltage detection circuit, etc.) that are set for use in the Peripheral Functions panel, only those relating to initialization are output.
Output folder	Inputs the output destination folder.	
File generation control	Click on this option to select the reaction to cases where a file having the same file name exists when the Generate Code button of the Peripheral Functions panel is clicked.	
	Do nothing if file exists	If a file with the same name exists, a new file will not be output.
	Merge file	If a file with the same name exists, a new file is merged with the existing file. Only the section between "/* Start user code ... . Do not edit comment generated here */" and "/* End user code. Do not edit comment generated here */" will be merged.
	Overwrite file	If a file with the same name exists, the existing file is overwritten by a new file.
Register files	Click on this option to select whether or not to register the output file in the project when the Generate Code button of the Peripheral Functions panel is clicked.	
	Register the generated files to the project	Registers the file.
	Not register the generated files to the project	Does not register the file.
Report type	Selects the output format for the report files (two files: Function and Macro) that are output when [Save Code Generator Report] is selected from the [File] menu.	
	HTML file	Outputs the files in the HTML format.
	CSV file	Outputs the files in the CSV format.

Remark Note that if the [Merge file] is selected in [File generate control], the number of left braces (“{”) and right braces (“}”) must match in the parts to be merged. When the numbers do not match, processing for correct merging is not possible.

(2) [Product Information] category

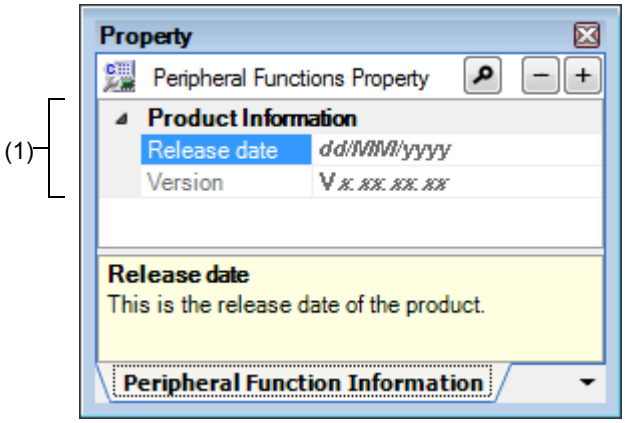
This area allows you to view the information (Release Date and Version) for the [Code Generator (Design Tool)] selected in the Project Tree panel.

Release Date	Displays the release date of the Code Generator (Design Tool).
Version	Displays the version number of the Code Generator (Design Tool).

[Peripheral Function Information] tab (Product Information)

This tab allows you to view the information (Product Information) for the [Peripheral Functions] selected in the Project Tree panel.

Figure A.5 [Peripheral Function Information] Tab (Product Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions], and then select [Property] from the context menu.

Remark If this panel is already open, selecting [Peripheral Functions] in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

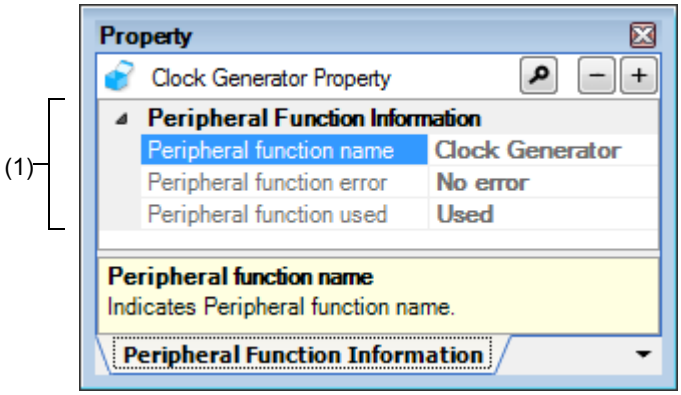
(1) [Product Information] category
This area allows you to view the information (Release date and Version) for the [Peripheral Functions] selected in the Project Tree panel.

Release date	Displays the release date of the Code Generator (Design Tool).
Version	Displays the version number of the Code Generator (Design Tool).

[Peripheral Function Information] tab (Peripheral Function Information)

This tab allows you to view the information (Peripheral Function Information) for the peripheral function node selected in the Project Tree panel.

Figure A.6 [Peripheral Function Information] Tab (Peripheral Function Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] >> Peripheral function node, and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] >> Peripheral function node, and then select [Property] from the context menu.

Remark If this panel is already open, selecting peripheral function node in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

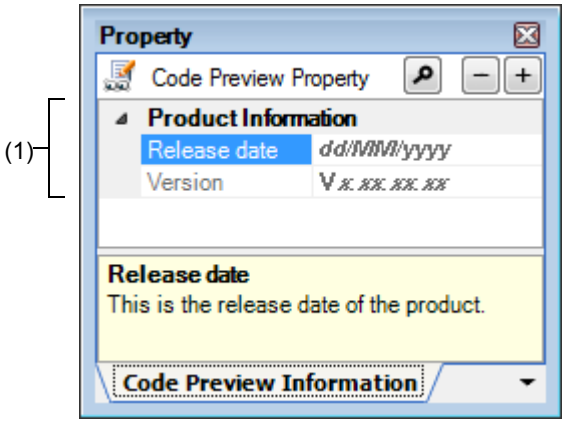
(1) [Peripheral Function Information] category
This area allows you to view the information (Peripheral function name, Peripheral function error and Peripheral function used) for the peripheral function node selected in the Project Tree panel.

Peripheral function name	Displays the name of the peripheral function.	
Peripheral function error	Displays whether or not the settings in the Peripheral Functions panel are correct.	
	No error	Illegal settings have not been detected.
	Input error	Illegal settings have been detected.
Peripheral function used	Indicates whether or not to use the peripheral function. Note that whether or not a function is to be used depends on the settings in the Peripheral Functions panel corresponding to the selected node.	
	Used	The peripheral function is to be used.
	No	The peripheral function is not to be used.

[Code Preview Information] tab (Product Information)

This tab allows you to view the information (Product Information) for the [Code Preview] selected in the Project Tree panel.

Figure A.7 [Code Preview Information] Tab (Product Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview], and then select [Property] from the context menu.

Remark If this panel is already open, selecting [Peripheral Functions] in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

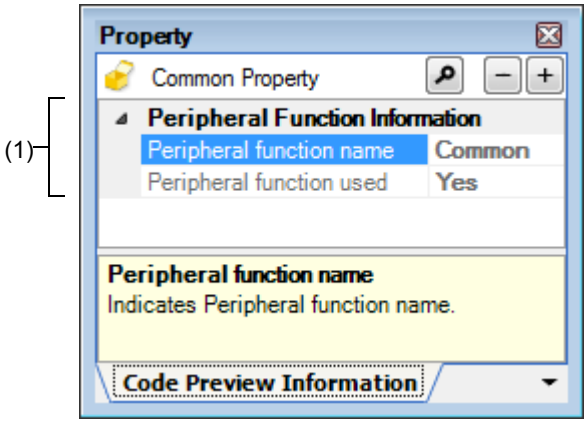
(1) [Product Information] category
This area allows you to view the information (Release Date and Version) for the [Code Preview] selected in the Project Tree panel.

Release Date	Displays the release date of the Code Generator (Design Tool).
Version	Displays the version number of the Code Generator (Design Tool).

[Code Preview Information] tab (Peripheral Function Information)

This tab allows you to view the information (Peripheral Function Information) for the peripheral function node selected in the Project Tree panel.

Figure A.8 [Code Preview Information] Tab (Peripheral Function Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node, and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node, and then select [Property] from the context menu.

Remark If this panel is already open, selecting peripheral function node in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

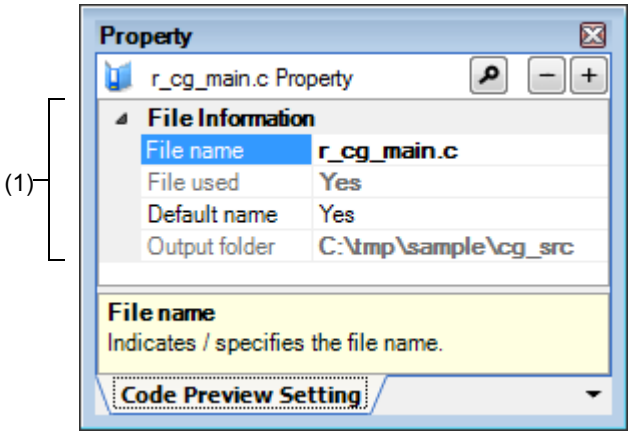
(1) [Peripheral Function Information] category
This area allows you to view the information (Peripheral function name and Peripheral function used) for the peripheral function node selected in the Project Tree panel.

Peripheral function name	Displays the name of the peripheral function.	
Peripheral function used	Indicates whether or not to use the peripheral function. Note that whether or not a function is to be used depends on the settings in the Peripheral Functions panel corresponding to the selected node.	
	Yes	The peripheral function is to be used.
	No	The peripheral function is not to be used.

[Code Preview Setting] tab (File Information)

This tab allows you to view the information (File Information) on and change the setting for the source code node selected in the Project Tree panel.

Figure A.9 [Code Preview Setting] Tab (File Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node, and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node, and then select [Property] from the context menu.

Remark If this panel is already open, selecting the source code node in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

(1) [File Information] category
This area allows you to view the information (Fine name, File used, Default name and Output folder) on and change the setting for the source code node selected in the Project Tree panel.

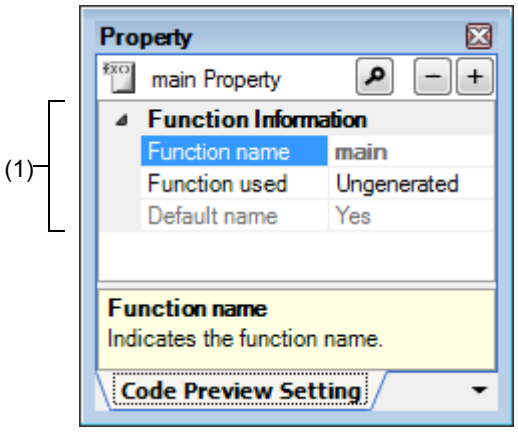
File name	Inputs the name of the file The name of the file can be changed by selecting [Rename] from the context menu after selecting the source code node in the Project Tree panel.	
File used	Indicates whether or not output to a file is to proceed when the Generate Code button in the Peripheral Functions panel is clicked. Note that whether or not this option is used depends on the settings in the Peripheral Functions panel corresponding to the selected node.	
	Yes	A file is output.
	No	A file is not output.

Default name	Selects whether or not to restore the default name of the file. Note that the default name of the file can be restored by selecting [Default] from the context menu after selecting the source code node in the Project Tree panel.	
	Yes	The default name is restored.
	No	The default name is not restored.
Output folder	Displays the output destination folder. Note that the output destination folder can be changed by using [Generate File Mode] >> [Output folder] in the [Code Generator Setting] tab.	

[Code Preview Setting] tab (Function Information)

This panel allows you to view the information on and change the setting for the node selected in the Project Tree panel.

Figure A.10 [Code Preview Setting] Tab (Function Information)



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node >> API function node, and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node >> API function node, and then select [Property] from the context menu.

Remark If this panel is already open, selecting the API function node in the Project Tree panel changes the content displayed to that corresponding to the selected node.

[Description of each area]

(1) [Function Information] category
This area allows you to view the information (Function name, Function used and Default name) on and change the setting for the API function node selected in the Project Tree panel.

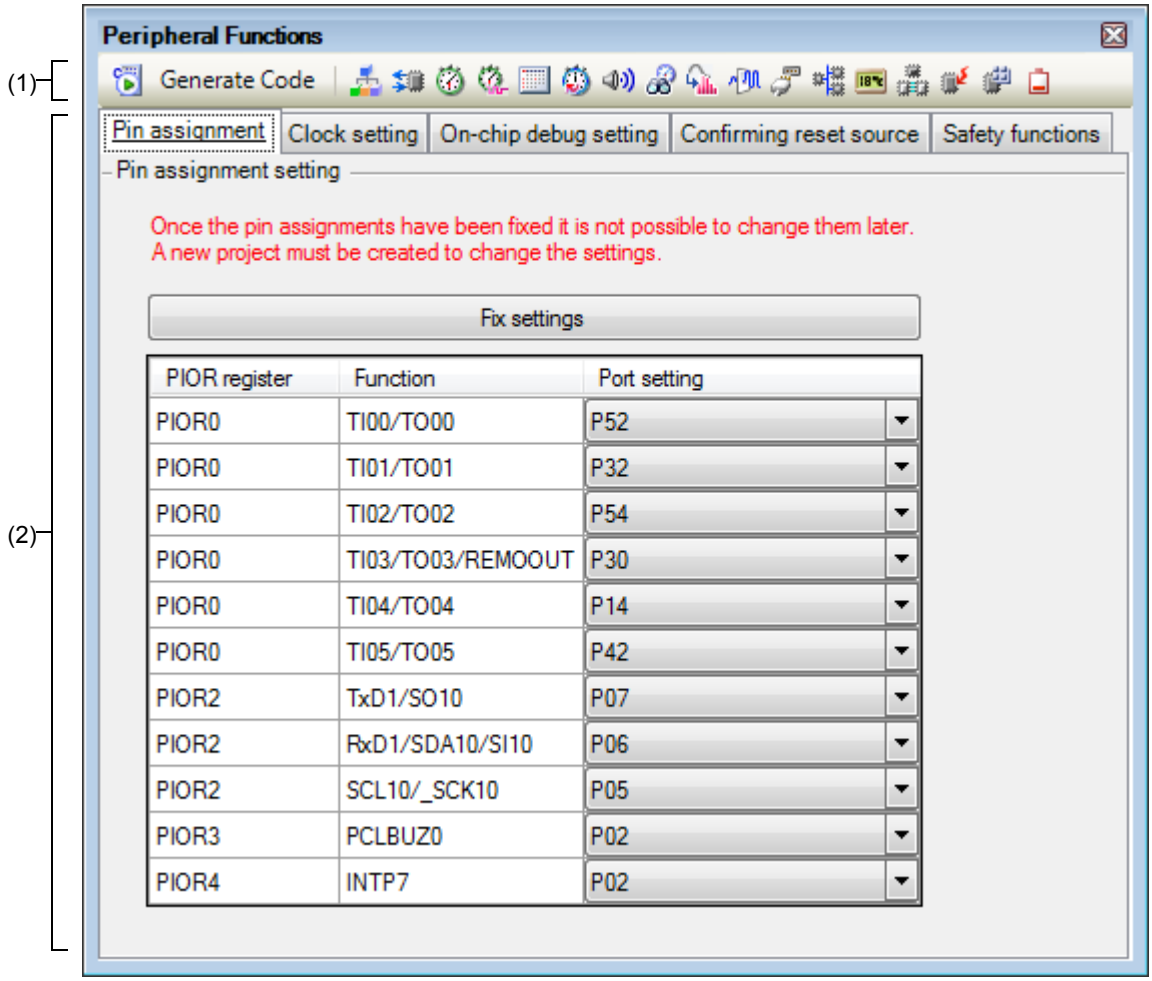
Function name	Inputs the name of the API function. Note that the name of the API function can be changed by selecting [Rename] from the context menu after selecting the API function node in the Project Tree panel.	
Function used	Selects whether or not to output the API function when the Generate Code button in the Peripheral Functions panel is clicked.	
	Generated	The API function is output.
	Ungenerated	The API function is not output.

Default name	Selects whether or not to restore the default name of the API function. Note that the default name of the API function can be restored by selecting [Default] from the context menu after selecting the source code node in the Project Tree panel.	
	Yes	The default name is restored.
	No	The default name is not restored.

Peripheral Functions panel

This panel allows you to configure the information necessary to control the peripheral functions (clock generator, port functions, etc.) provided.

Figure A.11 Peripheral Functions Panel



The following items are explained here.

- [How to open]
- [Description of each area]

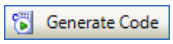
[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] (>> Peripheral function node).
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Peripheral Functions] (>> Peripheral function node), and then press the [Enter] key.
- From the [View] menu >> [Code Generator 2], select [Peripheral Functions].

Remark If this panel is already open, pressing a different peripheral function button “ , , etc.” changes the content displayed in the Information setting area accordingly.

[Description of each area]

(1) Toolbar
This area consists of the following “peripheral function buttons”.
When there is peripheral function target microcontroller is not supporting, peripheral functionbutton is not disokayed.

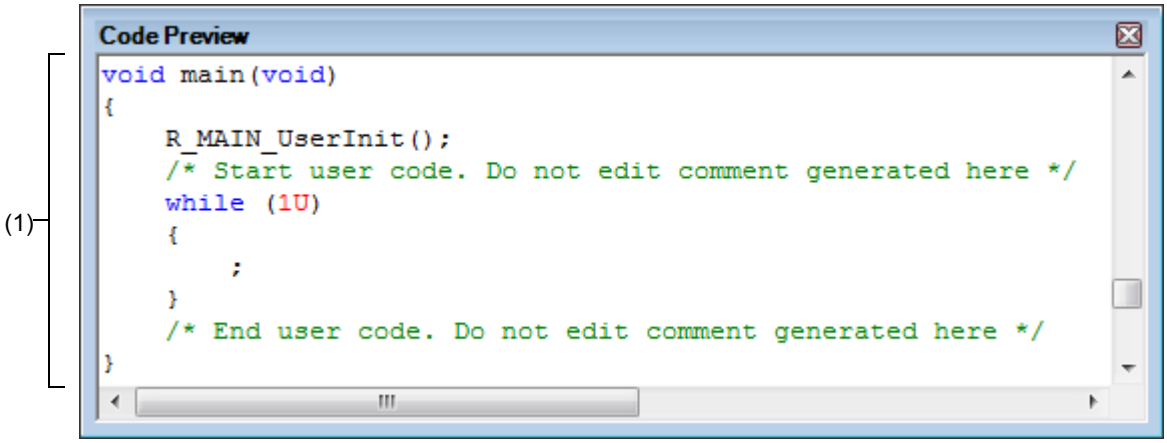
	Outputs the source code (device driver program) to the folder specified by selecting [Code Generator Setting] tab >> [Generate File Mode] >> [Output folder] in the Property panel.
, , etc.	Changes the content displayed in the Information setting area to information required for controlling peripheral functions.

(2) Information setting area
The content displayed in this area differs depending on the “peripheral function node” or “peripheral function button” selected or pressed when opening this panel.
See user’s manual for microcontroller for details on the items to be set.

Code Preview panel

This panel allows you to confirm the source code in accord with the settings of the Peripheral Functions panel.

Figure A.12 Code Preview Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node (>> API function node).
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Code Preview] >> Peripheral function node >> Source code node (>> API function mode), and then press the [Enter] key.
- From the [View] menu >> [Code Generator 2], select [Code Preview].

Remark If this panel is already open, double-clicking the source code node (>> API function node) changes the content displayed in the Source code display area to that corresponding to the selected node.

[Description of each area]

(1) Source code display area
This area allows you to confirm the source code (device driver program) that reflects the information configured in the Peripheral Functions panel.
The following table displays the meaning of the color of the source code text displayed in this area.

Green	Comment
Blue	Reserved word for C compiler
Red	Numeric value
Black	Code section
Gray	File name

Remark 1. You cannot edit the source code within this panel.

Remark 2. For some of the API functions, values such as the register value are calculated and finalized when the source code is generated (when the Generate Code button on the Peripheral Functions panel is pressed). For this reason, the source code displayed in this panel may not be the same as that would actually be generated.

[Context menu]

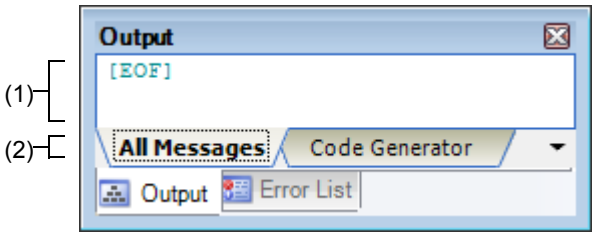
Copy	Sends the character string or lines selected with range selection to the clipboard.
Select All	Selects all the messages displayed on the Source code display area.

Output panel

This panel displays operation logs for various components (design tool, build tool, etc.) provided by CS+.
The messages are classified by the message origination tool and displayed on the individual tabs.

Remark The Message area can be zoomed in and out by 100% in the tool bar, or by operating the mouse wheel while holding down the [Ctrl] key.

Figure A.13 Output Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- From the [View] menu, select [Output].

[Description of each area]

(1) Message area
The output messages of each tool are displayed.
Note that the character colors/background colors of the message differ with the type of output message (and depend on the settings in the [General - Font and Color] category in the Option dialog box).

(2) Tab selection area
Select the tab that indicates the origin of message.
The following tabs are available for the Code Generator.

All Messages	Displays operation logs for all components (design tool, build tool, etc.) provided by CS+ in order of output.
Code Generator	Display only operation logs for the Code Generator out of those for various components (design tool, build tool, etc.) provided by CS+.

Caution Even if a new message is output on a deselected tab, tab selection will not automatically switch. In this case, " * " mark will be added in front of the tab name, indicating that a new message has been output.

[Context menu]

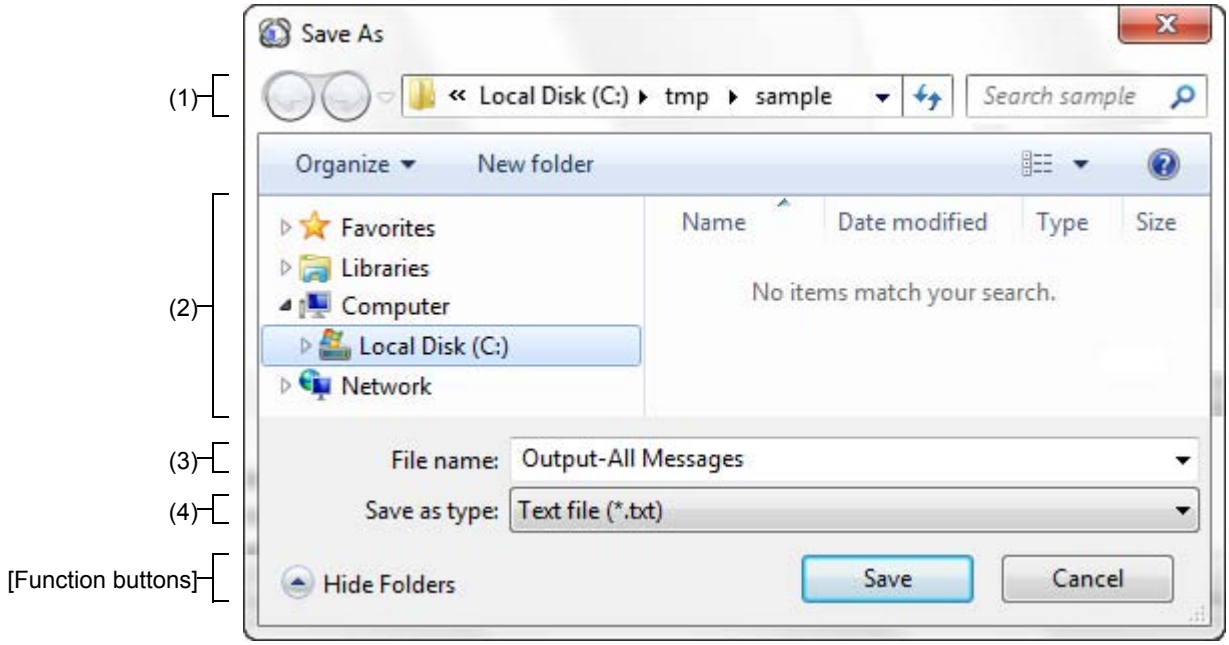
Copy	Sends the character string or lines selected with range selection to the clipboard.
Select All	Selects all the messages displayed on the Message area.
Clear	Deletes all the messages displayed on the Message area.
Tag Jump	Jumps to the caret line in the editor indicated by the message (file, line, and column).

Open Help for Message	Displays help for the message on the current caret location. This only applies to warning messages and error messages.

Save As dialog box

This dialog box allows you to name and save a file.

Figure A.14 Save As Dialog Box



The following items are explained here.

- [How to open]
- [Description of each area]
- [Function buttons]

[How to open]

- From the [File] menu, select [Save Output-*Tab Name*].
- From the [File] menu, select [Save Output-*Tab Name* As...].

[Description of each area]

(1) Folder location
This is for selection of the output destination folder (folder name).

(2) List of files
This area displays a list of files matching the conditions selected in Folder location and [Save as type].

(3) [File name]
Specify the name of the file (file name).

(4) [Save as type]
Select the type of the file (file type).

[Function buttons]

Save	Outputs a file having the name specified in the [File name] and [Save as type] to the folder specified in the Folder location.
Cancel	Ignores the setting and closes this dialog box.

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CS+ Code Generator

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